

Volunteer Monitoring & Citizen Science

- Overview of Citizen Science field, definition of terms,
- Examples/models of citizen science
- Research on outcomes of citizen science
- Similarities and unique features of citizen science and volunteer monitoring

Tina Phillips
Research & Evaluation Manager
Cornell Lab of Ornithology
tina.phillips@cornell.edu
[@tinabp69](#)

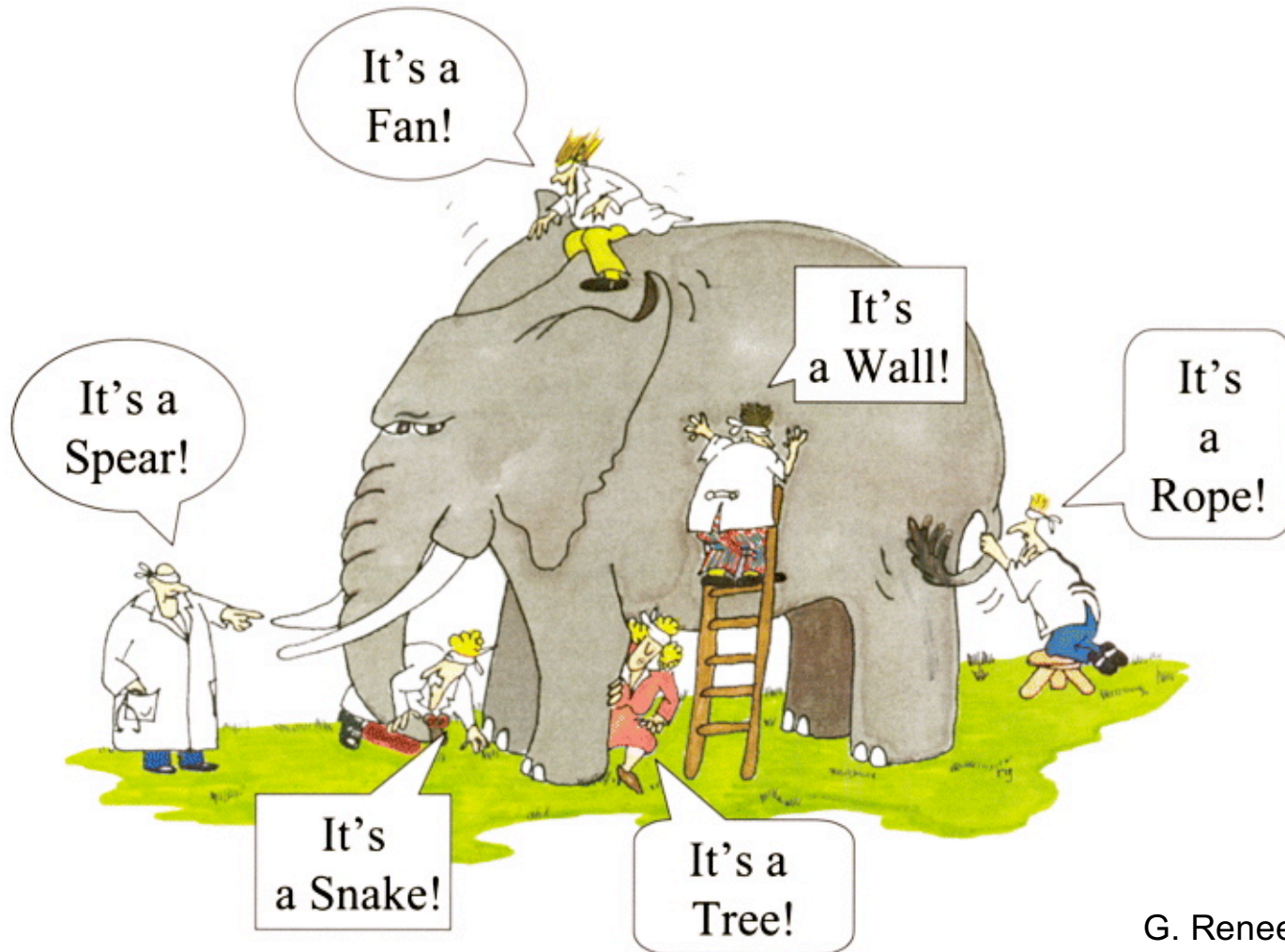
The National Water Quality Monitoring Council
webinar on
Citizen Science and Volunteer Monitoring
August 31, 2016

CORNELL LAB OF ORNITHOLOGY



*A membership institution interpreting and conserving the earth's biological diversity through research, education, and **citizen science** focused on birds*

What is citizen science?



G. Renee Guzlas

Definitions

Citizen science: *“scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions”*

– Oxford English Dictionary, 2014

Citizen-scientist: *“the amateur investigator who in the past contributed substantially to the development of science through part-time dabbling.”*

- New Scientist, 1979

Citizen Science/PPSR

Members of the public and professional scientists
engaged in collaborative research
to generate new science-based knowledge



What's in a name?

Label	Research Domain	Key Features
Civic science	Science communication	Public participation in decisions about science
People's science	Political science	Social movements for people-centered science
Citizen science	Ecology	Public participation in scientific research
Volunteer/community-based monitoring	Natural resource management	Long-term monitoring and intervention
Participatory action research	Behavioral science	Researcher & community participation & action
Action science	Behavioral science	Participatory, emphasizes tacit theories-in-use
Community science	Psychology	Participatory community-centered social science
Living Labs	Management	Public-private partnership for innovation

Some Typologies for Citizen Science

- Consultative, functional & collaborative
 - Lawrence, 2006
- **Contributory, collaborative, & co-created**
 - **CAISE report, 2009; Shirk et al. 2012**
- Action, conservation, investigation, virtual, & education
 - Wiggins & Crowston, 2011
- Participation levels and power relationships
 - Haklay, 2011
- Typologies based on goals & tasks
 - Wiggins & Crowston, 2012

Involvement in Science Process

	Contributory	Collaborative	Co-Created
Define a question/issue	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gather information	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Develop explanations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Design data collection methods	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Collect samples	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analyze samples	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analyze data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Interpret data/conclude	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Disseminate conclusions	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Discuss results/inquire further	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Early Citizen Science

1880: Lighthouse Surveys



1890: National
Weather Service
Cooperative
Observer Program



1900: National Audubon Society
Christmas Bird Count





nature's notebook



JOURNEY NORTH



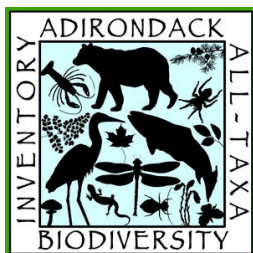
The Kansas Biological Survey, University of Kansas

Monarch Watch

Dedicated to Education, Conservation, & Research



TAXILES SKIPPER © PAUL A. OPLER



THE GLOBE PROGRAM
CONNECTING THE NEXT GENERATION OF SCIENTISTS



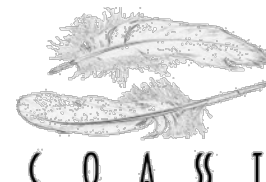
Evolution Medalab



Florida LAKEWATCH



The Lost Ladybug Project



C O A S T

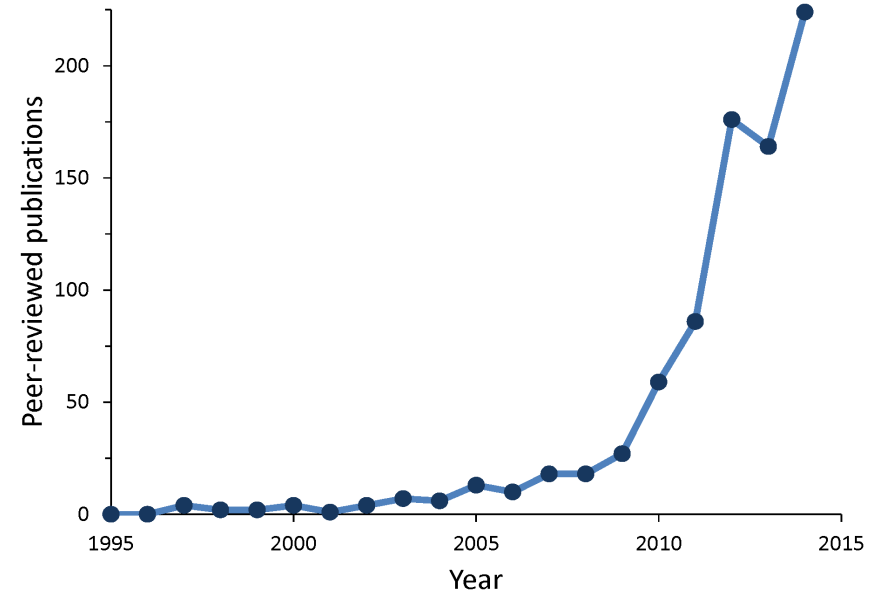


Project BudBurst
www.budburst.org



Growth of Citizen Science

- International conferences (USA, Europe, Australia)
- Special issues in leading journals (*Frontiers*, *Issues in Ecology*, *Biological Conservation*, *Conservation Biology*)
- 1500+ papers using CS data
- White House recognition
- Federal Community of Practice
- New journal, *Citizen Science: Theory and Practice*
- Citizen Science Association (free to join currently!)



TWIN CITIES, MINNESOTA
MAY | 17-20 | 2017

CALL FOR ABSTRACTS
NOW OPEN
AUGUST 29TH-OCTOBER 10TH



CITIZEN SCIENCE ASSOCIATION CONFERENCE MAY 17-20 2017



The power of citizen science

Citizen science is the involvement of the public in scientific research – whether community-driven research or global investigations. The Citizen Science Association unites expertise from educators, scientists, data managers, and others to power citizen science. Join us, and help speed innovation by sharing insights across disciplines.

over 1K
Projects

over 1M
Volunteers

over 4K
Members

Public Engagement in Science Program

- We design, **evaluate**, and **research** projects that engage the public in scientific research and conservation.
- We conduct field building activities for professionals who develop, evaluate, and research citizen science.



We develop
evaluation tools
and resources



We provide
advise and
consultation



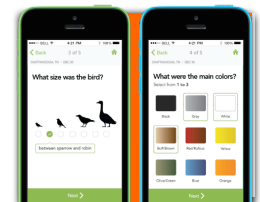
We support
youth
development
through CS



We provide
leadership for
citizen science
professionals



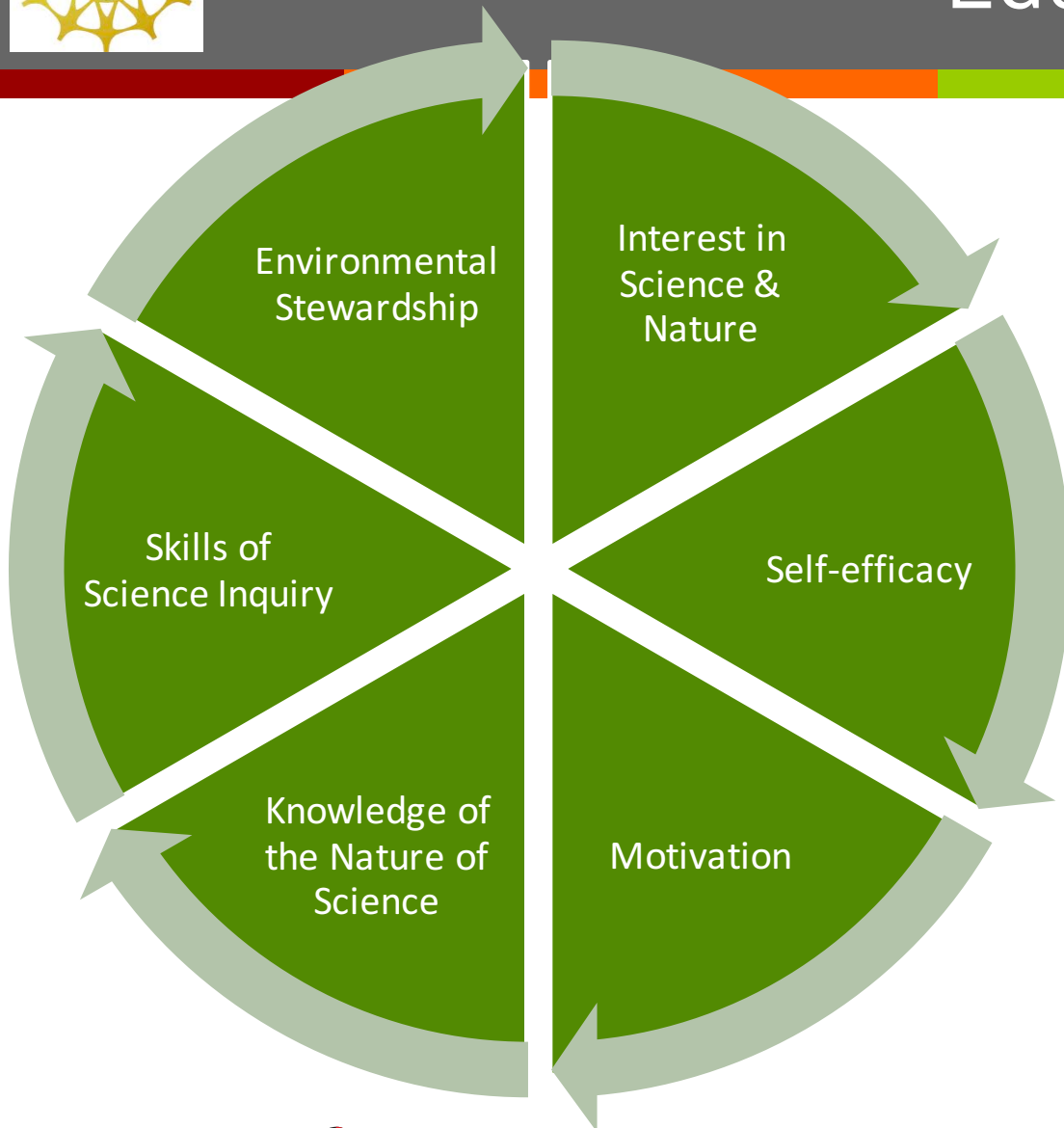
We conduct
research on
outcomes of CS



We help
design and
evaluate
projects.



Educational Outcomes



PUBLIC PARTICIPATION IN SCIENTIFIC RESEARCH: User's Guide for Project Evaluation

Tina Phillips
Marion Ferguson
Rick Bonney
Matthew Minarchek
Norman Porticella

citizenscience.org

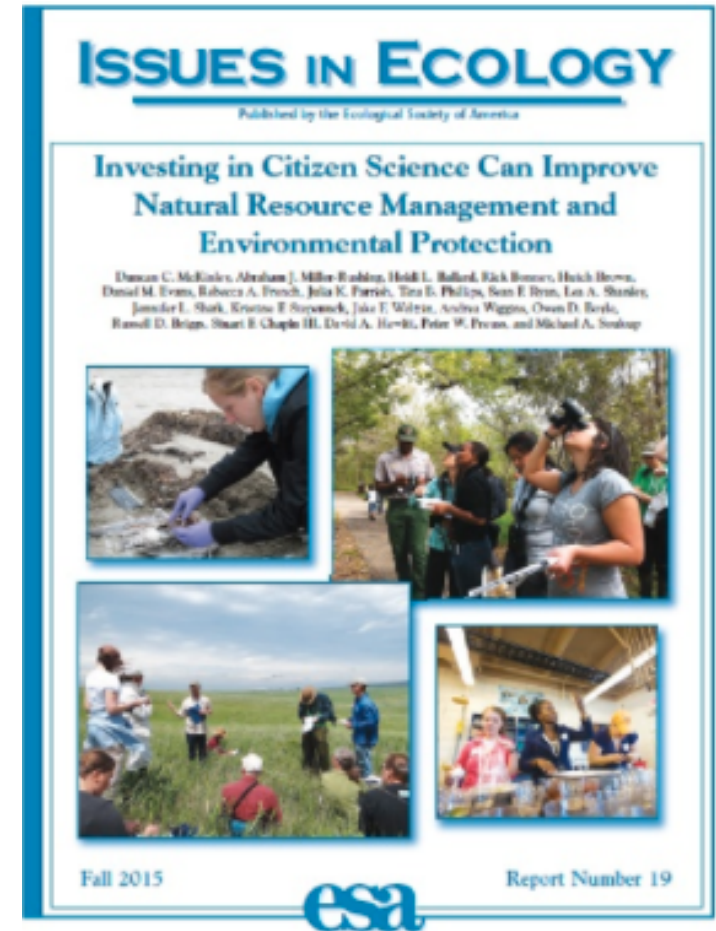
Research Outcomes

- Publicly available datasets
- Publications
- Interdisciplinary collaborations
- Grad students, dissertations
- New technologies
- Accessibility and utility of data
- Early detection
- Increased understanding of natural systems
- Data informing management decisions, regulations



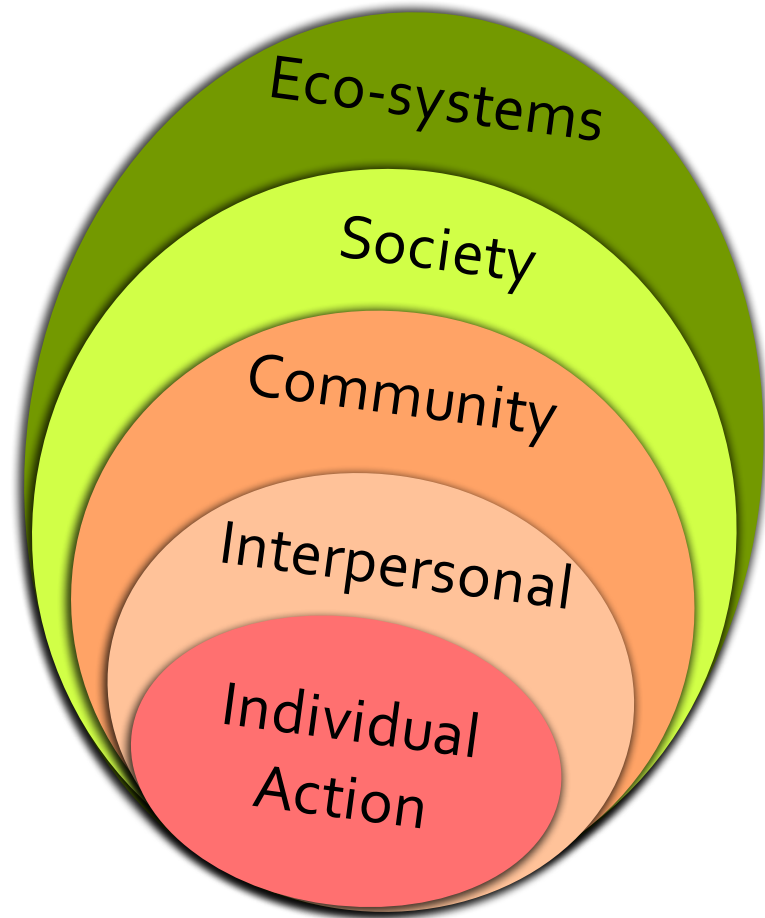
Policy & Conservation Outcomes

- Inclusion of local expertise
- Utility of data
- Local capacity building
- Policies and management plans
- Legislation passed
- Enforcement and adoption of plans, legislation, etc.



Community Outcomes

- Community buy-in and support
- Increased trust
- Social capital
- Economic impacts
- Environmental justice
- Disaster and conflict resiliency





Collaborative Research: Exploring Engagement and Science Identity through Participation (EESIP)

Engagement → Learning → Identity

- *Q1: What are the dimensions of citizen science engagement across different types of projects and how can we quantify them? (Qualitative)*
- *Q2: What is the relationship between participant engagement and science learning outcomes? (Quantitative)*
- *Q3: How does degree and quality of citizen science participation develop and/or reinforce science identity in participants? (Qualitative)*

Project Partners

Contributory (*scientist driven*)

Co-created (*community driven*)



NestWatch



Monarch
Larva
Monitoring
Project



Community
Collaborative
Rain, Hail,
and Snow
Network



Hudson
River Eel
Project



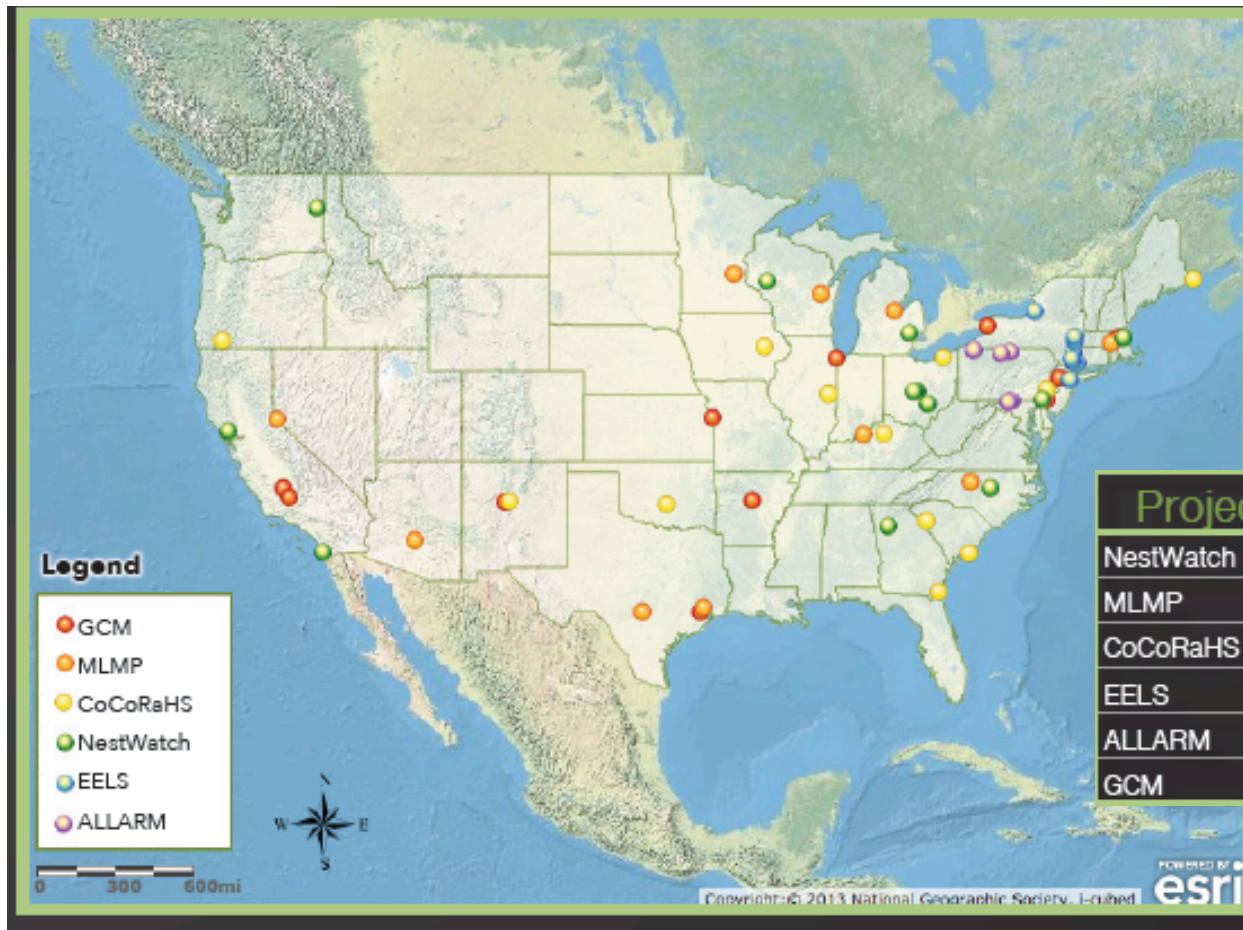
Global
Community
Monitor



Alliance for
Aquatic
Resource
Monitoring

- RQ1: What are the dimensions of citizen science engagement across different types of projects?

Distribution of Phase 1 Participants



Project	# of Interviewees
NestWatch	12
MLMP	12
CoCoRaHS	12
EELS	12
ALLARM	10
GCM	14

N = 72

Memorable Quotes from ALLARM

“...this was in the early ‘80s. And she was standing in the stream talking about the critters, the tiny bugs that lived in the stream, and I had never in my whole life thought about that, never been aware of it and I can recall that incident, see it in my mind’s eye. All of a sudden it was like Horton Hears a Who. You know what I mean? You realize that there’s so much that you don’t see that’s part of the food chain or whatever and right then I was sold. I was like “Oh my gosh. I’ve got to do more of this.” (LEARNING)

“I think with ALLARM’s and Trout Unlimited’s encouragement and our involvement with 3RQ it’s just forced me to take the blinders off and look at much, much bigger pictures what’s going on in the whole area – in the whole watershed rather than one little thing/aspect of it... I think the interest and some of the skills and experiences were always there. But they just needed a little – The saw needed sharpening.” (SKILLS)

“And, to me, doing teeny, tiny, little things is actually kind of away of maintaining control. And when large industries are kind of just taking advantage of these poor, little communities, like the ones that I live in and by doing things that are just tiny, little things like just not driving as much or making a choice about, ‘Am I gonna buy this? Am I not gonna buy this?’ that seems like a way of maintaining control. And by having, kind of, some scientific knowledge kind of gives you a place to start, to start making your choices from.” (BEHAVIOR CHANGE, EMPOWERMENT)

Thank you!

Tina Phillips

tina.phillips@cornell.edu

